

A1
CONT.

QS-18, or QS-21, and more preferably, the substantially pure saponin comprises QS-21. In yet other preferred embodiments of the first aspect, the composition is further directed to one in which the oligonucleotide is chemically modified. More particularly, the oligonucleotide is modified with at least one phosphorothioate internucleotide linkage. A preferred embodiment of the first aspect encompasses the composition wherein the oligonucleotide comprises a CpG motif having the formula 5'X₁CGX₂3' (SEQ ID NO: 1), wherein at least one nucleotide separates consecutive CpGs, and wherein X₁ is adenine, guanine, or thymine, and X₂ is cytosine, thymine, or adenine. More preferably, the CpG motif comprises TCTCCCAGCGTGCGCCAT (SEQ ID NO: 2) or TCCATGACGTTCTGACGTT (SEQ ID NO: 3) or TCGTCGTTTTGTCGTTTTGTCGTT (SEQ ID NO: 4). The composition, according to the first aspect of the invention, preferably increases an innate immune response when administered to a mammal or a human. Still another preferred embodiment is directed to the composition wherein the composition enhances a natural killer cell response, preferably in a positive synergistic manner.--

On pages 5 and 6, please replace the paragraph beginning, "In a second aspect" with the following paragraph:

A2

--In a second aspect, the invention is directed to a method for stimulating innate immunity comprising administering an effective amount of a composition comprising: (a) a saponin; and (b) an oligonucleotide comprising at least one unmethylated CpG motif to an individual. Preferably, the method provides that the saponin is derived from *Quillaja saponaria*, and more preferably, the saponin is chemically modified or comprises a substantially pure saponin. In a preferred embodiment of the second aspect, the substantially pure saponin comprises QS-7, QS-17, QS-18, or QS-21, and more preferably, the substantially pure saponin comprises QS-21. In yet other preferred embodiments of the second aspect, the method is further directed to one in which the oligonucleotide is chemically modified. More particularly, the oligonucleotide is modified with at least one phosphorothioate internucleotide linkage. A preferred embodiment of the second aspect encompasses the method wherein the oligonucleotide comprises a CpG motif having the formula 5'X₁CGX₂3' (SEQ ID NO: 1), wherein at least one nucleotide separates consecutive CpGs, and wherein X₁ is adenine, guanine, or thymine, and X₂ is cytosine, thymine, or adenine. More preferably, the CpG motif comprises TCTCCCAGCGTGCGCCAT

A2
CONT.

(SEQ ID NO: 2) or TCCATGACGTTCTGACGTT (SEQ ID NO: 3) or TCGTCGTTTTGTCGTTTTGTCGTT (SEQ ID NO: 4). The method, according to this second aspect of the invention, preferably further increases an innate immune response when administered to a mammal or a human. Still another preferred embodiment is directed to the method for further enhancing a natural killer cell response, preferably in a positive synergistic manner.--

On page 14, please replace the paragraph beginning, "One embodiment" with the following paragraph:

A3

--One embodiment of the invention covers the oligonucleotide which contains a CpG motif having the formula 5'X₁CGX₂3' (SEQ ID NO: 1), wherein at least one nucleotide separates consecutive CpGs, and wherein X₁ is adenine, guanine, or thymine, and X₂ is cytosine, thymine, or adenine.--

On pages 14 and 15, please replace the paragraph beginning, "In another embodiment" with the following paragraph:

--In another embodiment, the oligonucleotide sequences useful in the methods of the invention are represented by the formula:

5'N₁X₁CGX₂N₂3' (SEQ ID NO: 5)

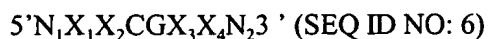
A4

wherein at least one nucleotide separates consecutive CpGs; X₁ is adenine, guanine, or thymine; X₂ is cytosine or thymine, N₁ is any nucleotide and N₁ + N₂ is from about 0-26 bases. In a preferred embodiment, N₁ and N₂ do not contain a CCGG quadmer or more than one CGG trimer; and the nucleic acid sequence is from about 8-30 bases in length. However, nucleic acids of any size (even may kb long) can be used in the invention if CpGs are present, as larger nucleic acids are degraded into oligonucleotides inside cells. Preferred synthetic oligonucleotides do not include a CCGG quadmer or more than one CCG or CGG trimer at or near the 5' or 3' terminals and/or the consensus mitogenic CpG motif is not a palindrome. A "palindromic sequence" or "palindrome" means an inverted repeat (*i.e.*, a sequence such as ABCDEE'D'C'B'A', in which A and A' are bases capable of forming the usual Watson-Crick base pairs.--

On page 15, please replace the paragraph beginning, "In still another embodiment" with the following paragraph:

A5

--In still another embodiment, the method of the invention includes the use of an oligonucleotide which contains a CpG motif represented by the formula:



wherein at least one nucleotide separates consecutive CpGs; X_1X_2 is selected from the group consisting of GpT, GpG, GpA, ApT and ApA; X_3X_4 is selected from the group consisting of TpT or CpT; N is any nucleotide and N_1+N_2 is from about 0-26 bases. In a preferred embodiment, N_1 and N_2 do not contain a CCGG quadmer or more than one CCG or CGG trimer. CpG oligodeoxynucleotides are also preferably in the range of 8 to 30 bases in length, but may be of any size (even many kb long) if sufficient motifs are present, since such larger nucleic acids are degraded into oligonucleotides inside of cells. Preferred synthetic oligonucleotides of this formula do not include a CCGG quadmer or more than one CCG or CGG trimer at or near the 5' and/or 3' terminals and/or the consensus mitogenic CpG motif is not a palindrome. Other CpG oligonucleotides can be assayed for efficacy using methods described herein.--

On page 15, please replace the paragraph beginning, "In a preferred embodiment" with the following paragraph:

A6

--In a preferred embodiment, the CpG motif comprises

TCTCCCAGCGTGCGCCAT (SEQ ID NO: 2) (also known as "CpG sequence 1758") or TCCATGACGTTCTGACGTT (SEQ ID NO: 3)(also known as "CpG sequence 1826") or TCGTCGTTTTGTCGTTTTGTCGTT (SEQ ID NO: 4)(also known as "CpG sequence 2006").--

On pages 19 and 20, please replace the paragraph beginning, "Yet another embodiment" with the following paragraph:

A7

--Yet another embodiment of this first aspect is directed to the oligonucleotide comprising at least one unmethylated CpG dinucleotide, wherein the oligonucleotide is modified. The particular modification may comprise at least one phosphorothioate internucleotide linkage. Further, the oligonucleotide having at least one unmethylated CpG dinucleotide may comprise a CpG motif having the formula $5'X_1CGX_23'$, wherein at least one nucleotide separates consecutive CpGs, and wherein X_1 is adenine, guanine, or thymine, and X_2 is cytosine, thymine, or adenine. The CpG motif may preferentially be TCTCCCAGCGTGCGCCAT (SEQ ID NO: 2)

A7
CON 4.
or TCCATGACGTTCTGACGTT, (SEQ ID NO: 3) or
TCGTCGTTTTGTCGTTTTGTCGTT (SEQ ID NO: 4).--

On pages 21 and 22, please replace the paragraph beginning, "In a second aspect" with the following paragraph:

A8
--In a second aspect, the invention is directed to a method for increasing the innate immune response in an individual or a test system comprising administering an effective amount of a composition comprising a saponin with or without an oligonucleotide comprising at least one unmethylated CpG dinucleotide. Preferably, the saponin is a saponin from *Quillaja saponaria* Molina. More preferably, the saponin is a partially pure or a substantially pure saponin from *Quillaja saponaria* Molina. The method may also embody a composition comprising more than one substantially pure saponin and an oligonucleotide comprising at least one unmethylated CpG dinucleotide. The substantially pure saponin is preferably QS-7, QS-17, QS-18, or QS 21. Most preferably, the substantially pure saponin is QS-21. In a further preferred embodiment, the saponin may cover a chemically modified saponin or a biologically active fraction thereof obtainable from a crude *Quillaja saponaria* Molina extract. In a preferred embodiment of the method, the oligonucleotide containing at least one CpG motif is preferably a monomer or a multimer. Another preferred embodiment of the method includes the CpG motif as a part of the sequence of a vector. Yet another embodiment is directed to the method wherein the oligonucleotide comprises at least one unmethylated CpG dinucleotide, and wherein furthermore the oligonucleotide may be chemically modified to stabilize the oligonucleotide against endogenous endonucleases. The modification may comprise at least one phosphorothioate internucleotide linkage. Further, the method may be directed, in part, to the oligonucleotide having at least one unmethylated CpG dinucleotide comprising a CpG motif having the formula 5'X₁CGX₂3' (SEQ ID NO: 1), wherein at least one nucleotide separates consecutive CpGs, and wherein X₁ is adenine, guanine, or thymine, and X₂ is cytosine, thymine, or adenine. In another preferred method, the unmethylated CpG motif is TCTCCCAGCGTGCGCCAT (SEQ ID NO: 2), TCCATGACGTTCTGACGTT (SEQ ID NO: 3), or TCGTCGTTTTGTCGTTTTGTCGTT (SEQ ID NO: 4).--
